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GROUP 3600

RESPONSE AFTER FINAL REJECTION
EXPEDITED PROCEDURE
EXAMINING GROUP 3644

PATENT
PD-YR1-52

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: SUSAN SEBATA ET AL.
Serial No.: 10/007,256
Filed: November 11, 2001
For: TWO-SIDED DEPLOYABLE THERMAL
RADIATOR SYSTEM AND METHOD

: Date: October 19, 2002
:
: Group Art Unit: 3644
:
: Examiner: Tien Q. Dinh

RESPONSE AFTER FINAL REJECTION

Commissioner of Patents and Trademarks
Washington, D. C. 20231

Sir:

In response to the Office Action mailed October 10, 2002, please consider the following remarks regarding the allowability of the above-identified patent application.

Regarding the status of the present application, Claims 1-3 are pending in this application. Reconsideration of this application is respectfully requested. It is respectfully submitted that the present response does not require further searching on the part of the Examiner. It is also respectfully submitted that this response places this application in condition for allowance, or in any event, places it in better condition for consideration on appeal.

Claims 1-3 were rejected under 35 U.S.C. § 103(a) as being unpatentable over US Patent No. 5,787,969 issued to Drolen et al in view of US Patent No. 5,755,406 issued to Aston et al. and US Patent No. 4,880,050 issued to Nakamura et al.

The Examiner stated that "Drolen et al discloses a spacecraft radiator system having a first and second opposite facing payload radiators, one or more deployable radiators and heat pipes that thermally couple the payload radiators to selected ones of the deployable radiators." and that "Nakamura et al teaches heat pipes that are used to couple two radiator panels that are on opposite sides are well known in the art." The Aston et al. patent is cited as disclosing that solar arrays are well known in the art.

The Drolen et al. patent discloses "A closed-loop heat pipe transport design for a deployment application having a flexible section which connects to a payload structure and a deployable structure. The flexible section is a coil which is offset from the axis of rotation of the deployable structure. Upon rotation of the deployable structure around a predetermined axis, the flexible coil decompresses and sweeps in an arcuate fashion with a portion of said flexible coil aligning with the axis. When the deployable structure has completed its rotation and is fully deployed, the flexible coil will rest in substantially the same plane as it did before sweeping."

The Drolen et al. patent discloses fixed and deployable radiators. The Drolen et al. patent discloses that a flex coil 22 is used to couple the fixed and deployable radiators on one side of the spacecraft. However, it is respectfully submitted that the Drolen et al. patent does

not disclose or suggest that a fixed radiator on one side of the spacecraft is coupled to a deployable radiator on the opposite side of the spacecraft, as is done in the present invention.

Therefore, it is respectfully submitted that the Drolen et al. patent discloses that the deployable radiators on one side of the spacecraft are coupled to the fixed radiator on the same side of the spacecraft. However, it is respectfully submitted that the Drolen et al. patent does not disclose or suggest anything regarding coupling any of the radiators on one side of the spacecraft to radiators on the opposite side of the spacecraft.

Furthermore, it is respectfully submitted that the Aston et al. patent does not disclose or suggest anything regarding coupling any of the radiators on one side of the spacecraft to radiators on the opposite side of the spacecraft.

The Nakamura et al. patent discloses "A thermal management system for a spacecraft includes a plurality of T-shaped pallets each having a radiator panel and mounting panel. The radiator panels are connected end to end to enclose an interior space including the mounting panels. The mounting panels have electronic equipment mounted thereon. L-shaped external heat pipes contact both the mounting panel and radiator panel of each pallet to provide heat transfer from the electronic equipment to the radiator panel when the radiator panel is facing away from the sun. In order to cool the electronic equipment mounted on a pallet facing the sun, a closed-loop heat pipe is disposed in the interior space and each pallet includes L-shaped internal heat pipes contacting the closed-loop heat pipe and the mounting panel. Heat generated in the electronic equipment of the pallet facing the sun is transferred to the internal heat pipes via the mounting panel and then to the closed-loop heat pipe. The heat then is transferred to the radiator panels facing away from the sun via the closed-loop heat pipe, the internal heat pipes, the mounting panels, and the external heat pipes."

The Nakamura et al. patent discloses the use of fixed radiators and does not disclose or suggest anything regarding the used of deployable radiators. While the Nakamura et al. patent discloses heat is transferred "from a pallet facing the sun ... is transferred to the radiator panels facing away from the sun via the closed-loop heat pipe", it is respectfully submitted that there is no disclosure or suggestion contained therein regarding "heat pipes that thermally couple each payload radiator to the one or more deployable radiators disposed on a side of the spacecraft that is opposite to the respective payload radiator" as is provided by the present invention. The fact that the Nakamura et al. patent discloses that heat is transferred from the sun-facing side of the spacecraft to the opposite side of the spacecraft is not a teaching or suggestion regarding transferring heat from a radiator on one side of the spacecraft to a deployable radiator on the other side of the spacecraft.

It is respectfully submitted that the Examiner's rejection is necessarily based upon hindsight reconstruction using the teachings of the cited references in light of Applicants' own teachings. This is true since the Drolen et al. patent discloses that the deployable radiators on one side of the spacecraft are coupled to the fixed radiator on the same side of the spacecraft and does couple the radiators on one side of the spacecraft to radiators on the opposite side of the spacecraft, and the Nakamura et al. patent only discloses transferring heat from a fixed

radiator panel facing the sun to a fixed radiator panel facing away from the sun. Therefore, neither of these references disclose or suggest coupling a fixed radiator on one side of the spacecraft to one or more deployable radiators disposed on the opposite side of the spacecraft from the payload radiator. This is only taught in the present specification.

Claim 1 calls for a spacecraft radiator system comprising "heat pipes that thermally couple each payload radiator to the one or more deployable radiators disposed on a side of the spacecraft that is opposite to the respective payload radiator."

Claim 2 calls for a spacecraft comprising "heat pipes that thermally couple the respective payload radiators to the one or more deployable radiators disposed on a side of the spacecraft that is opposite to the respective payload radiator."

Claim 3 calls for a spacecraft heat dissipation method that comprises "configuring a spacecraft to have a body, one or more solar arrays, first and second opposite facing fixed payload radiators, one or more deployable radiators that radiate heat from both sides thereof, and heat pipes that thermally couple the respective payload radiators to the one or more deployable radiators disposed on a side of the spacecraft that is opposite to the respective payload radiator."

It is respectfully submitted that the Drolen et al., Aston et al. or Nakamura et al. patents, taken singly or together, do not disclose or suggest these claimed aspects of the present invention, and not without extending the teachings of the cited references and using hindsight reconstruction. Therefore, it is respectfully submitted that the inventions recited in Claims 1-3 are not disclosed or suggested by the Drolen et al., Aston et al. or Nakamura et al. patents, taken singly or together. Accordingly, withdrawal of the Examiner's rejection and allowance of Claims 1-3 are respectfully requested.

The prior art heretofore made of record and not relied upon is considered pertinent to applicant's disclosure to the extent indicated by the Examiner.

In view of the above, it is respectfully submitted that all pending Claims are not obvious in view of the cited patents, and are therefore patentable. Accordingly, it is respectfully submitted that the present application is in condition for allowance. Reconsideration and allowance of this application are earnestly solicited. It is again respectfully submitted that this response does not require further searching, and places this application in condition for allowance, or in any event, places it in better condition for consideration on appeal.

Respectfully submitted,



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RESPONSE UNDER 37 CFR §1.116
EXPEDITED PROCEDURE
EXAMINING GROUP 3644

PATENT
PD-YR1-52

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Susan Sebata et al.
Serial No. 10/007,256
Filed: November 11, 2001
For: Two-Sided Deployable Thermal Radiator System and
Method

: Date: October 19, 2002
: Group Art Unit: 3644
: Examiner: Tien Q. Dinh
: Batch No.:
: Patent No.:

**CERTIFICATE OF MAILING
UNDER 37 CFR 1.8**

The Commissioner of Patents and Trademarks
Washington, D.C. 20231

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Identification of Transmitted Papers

Response after final rejection comprising 3 pages, Transmittal letter in duplicate, return receipt postcard

I hereby certify that the above-identified correspondence is being deposited with the United States Postal Service on October 19, 2002 with sufficient postage as first class mail, and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

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TRANSMITTAL LETTER

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Sir:

Transmitted herewith is an amendment in the above-identified application.

☒ No additional fee is required.

☐ The fee has been calculated as shown below:

CLAIMS AS AMENDED

CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NO. PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	ADDITIONAL TOTAL
Total Claims <u>3</u> minus <u>20</u> = <u>0</u>	X	\$ 18.00	=	\$ 0.00
Independent Claims <u>3</u> minus <u>3</u> = <u>0</u>	X	\$ 84.00	=	\$ 0.00
Multiple Dependent Claims <u>0</u>	X	\$ 280.00	=	\$ 0.00
TOTAL ADDITIONAL FEES FOR THIS AMENDMENT				\$ 0.00

A cheque in the amount of \$0.00 is enclosed with this Transmittal Letter to cover these costs. This form is submitted in duplicate.

Respectfully submitted

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